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THESIS

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) ASSESSMENT TEAMS FOR FIRST RESPONDERS IN HUMANITARIAN ASSISTANCE/DISASTER RELIEF (HA/DR) MISSIONS

by

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March 2012

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13. ABSTRACT (maximum 200 words)

Immediately following a natural disaster requiring Humanitarian Assistance/Disaster Relief (HA/DR), a myriad of organizations respond. Typically, these early responders send small assessment teams to determine critical needs, which are then paired with the resources available. The needs can range from basic subsistence (food, shelter, and water) to transportation and infrastructure, yet the paramount factor among each team is the need to communicate. To assist in this effort, an Information and Communications Technology (ICT) assessment team using standardized tactics, techniques, procedures and training to maximize effectiveness—and comprised of members from multiple organizations—could provide a shared prospective among member groups that could ultimately produce a more objective and complete communications assessment. This in turn, could be transmitted immediately to the global response community via appropriate information sharing portals. As no such model exists at present, our research attempts to pioneer and explore this concept and capability by exploring and providing an outline of an ICT assessment team model. In this thesis, we examine its potential structure, methodologies, and equipment, as well as discuss prospective funding sources, and include in the appendices, checklists derived from our findings, thus improving and hastening early responders' understanding of a disaster's communications situation.

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INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) ASSESSMENT TEAMS AS A FIRST RESPONDER FOR HUMANITARIAN ASSISTANCE/DISASTER RELIEF (HA/DR)

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Immediately following a natural disaster requiring Humanitarian Assistance/Disaster Relief (HA/DR), a myriad of organizations respond. Typically, these early responders send small assessment teams to determine critical needs, which are then paired with the resources available. The needs can range from basic subsistence (food, shelter, and water) to transportation and infrastructure, yet the paramount factor among each team is the need to communicate. To assist in this effort, an Information and Communications Technology (ICT) assessment team using standardized tactics, techniques, procedures and training to maximize effectiveness—and comprised of members from multiple organizations—could provide a shared prospective among member groups that could ultimately produce a more objective and complete communications assessment. This in turn, could be transmitted immediately to the global response community via appropriate information sharing portals. As no such model exists at present, our research attempts to pioneer and explore this concept and capability by exploring and providing an outline of an ICT assessment team model. In this thesis, we examine its potential structure, methodologies, and equipment, as well as discuss prospective funding sources, and include in the appendices, checklists derived from our findings, thus improving and hastening early responders' understanding of a disaster's communications situation.

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LIST OF ACRONYMS AND ABBREVIATIONS

BGAN	Broadband Global Area Network
BHR	Bureau for Humanitarian Response
CDHAM	Center for Disaster and Humanitarian Assistance Medicine
CMTS	Cable Modem Termination System
ECHO	European Commission Humanitarian Office
ETC	Emergency Telecommunications Cluster
HA/DR	Humanitarian Assistance/Disaster Relief
HC	Humanitarian Coordinator
HCT	Humanitarian Country Team
HF	High Frequency
HFN	Hastily Formed Network
ICT	Information and Communications Technology
INAC	Initial Needs Assessment Checklist
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MHz	Millions of Cycles Per Second
NFI	Non-Food Items
NGO	Non-Governmental Organization
OFDA	Office of U. S. Foreign Disaster Assistance
PVO	Private Voluntary Organizations
RC	Resident Coordinator
RoIP	Radio over IP
Sat Phone	Satellite Phone

SMS	Short Message Service
TSF	Télécoms Sans Frontières
UHF	Ultra high Frequency
USAID	U.S. Agency for International Development
USG	U.S. Government
VHF	Very High Frequency
WFP	World Food Program
Wi-Fi	Internet Meshed Wireless Fidelity
WiMAX	Internet Coverage Worldwide Interoperability for Microwave Access

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I. INTRODUCTION

A. BACKGROUND

Immediately following a natural disaster or other event requiring Humanitarian Assistance/Disaster Relief (HA/DR), a multitude of organizations have traditionally responded. These organizations include Non-Government Organizations (NGOs), aid agencies, government (domestic and international) agencies, military, academia, and industry. Typically, these early responders send small assessment teams to determine what needs are present, which are then paired with the resources available. The needs can range from basic subsistence (food, shelter, and water) to transportation and infrastructure that thus necessitates the assessment of needs. The common factor among each team is the need to communicate.

To provide relief both in the short and long term, communication is indispensable. In some instances, the assessment teams are unable to be fully effective due to a lack of Information and Communication Technology (ICT). Existing technologies are available and utilized in many cases but each organization assesses and provides its own ICT. Communication is not only essential for the relief providers, but also for the effected population as well.

Several types of existing assessment teams for disaster response are already in place. The United Nations Disaster Assessment and Coordination (UNDAC), United States Agency for International Development (USAID) and many others are some of the agencies that have these teams but neither ICT nor information sharing multi-agency assessment teams exist. Assessment teams are usually formed using personnel who possess particular skill sets to observe, report, and react to particular needs. An ICT assessment team comprised of members from multiple organizations could provide a shared prospective among member groups that would ultimately produce a more objective and complete assessment, and as such, lead to more a efficient distribution of resources to maximize effectiveness. An ICT assessment team would require standardized tactics, techniques, procedures and training to maximize effectiveness.

These requirements and the multi-organizational team concept are the focus of this study. No organizations, activities or programs designed to do these critical ICT assessments are in existence today. This thesis attempts to pioneer this concept and capability.

B. RESEARCH OBJECTIVES

The purpose of this research is to develop an ICT and information sharing assessment team model for academia, industry, United Nations (UN), NGOs, U.S. Government (Department of Defense, Department of Homeland Security, United States Agency for International Development, State Department, etc.) and international government organizations. The ICT assessment team model is envisioned to include training, optional technologies, overcoming organizational biases and conditioned tendencies, technologies to facilitate information sharing, agreements on decision making and coordination, and involvement of citizens, industry and civilian and military entities.

C. METHODOLOGY

A qualitative analysis of existing disaster assessment team organizations and functionality to identify best practices is conducted.

A qualitative analysis of portable ICT equipment to identify potential communications “fly-away kit” configurations is done to enable teams to communicate both internally and externally within their organizational structure.

A qualitative analysis of non-ICT standard operating procedures and assessment teams is performed to identify what could be applied to an ICT and information sharing assessment team.

D. SCOPE

The primary objective of this research is to determine the basic design of a potential future multi-organizational ICT assessment team. The application of the criteria and recommendations allows decision makers to implement an assessment team

capability to provide insight to more effective and cost efficient HA/DR operations. The impact of this research is intended to support the creation of a multi-organizational ICT assessment team for disaster response.

E. ORGANIZATION OF THESIS

Chapter I presents the introduction and overview of this thesis.

Chapter II gives a synopsis of assessment teams and their procedures.

Chapter III describes various types of assessment team equipment.

Chapter IV explains the various assessment team dynamics.

Chapter V conveys considerations for access into disaster zones.

Chapter VI provides potential funding considerations.

Chapter VII concludes this thesis and recommends future research areas.

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II. ASSESSMENT TEAMS

A. EARLY RESPONDER ORGANIZATIONS

According to Goyet and Morinière, several distinct types of humanitarian needs assessment are not easily compared.

- Assessments of short-term, fast changing and most immediate humanitarian needs, such as health, food and shelter, in contrast with assessments of damage and loss (economic valuation of recovery needs)
- Cross-sectional assessments versus more specialized thematic or sectional surveys
- Formal, structured and often scientific assessments as compared to descriptive compilations fuelling situation analysis.
- Assessments available or intended for general, common use as opposed to those left unshared and kept for internal agency planning (Goyet & Morinière, 2006)

Many assessment teams exist and are employed as early responders for disaster response. United Nations Disaster Assessment and Coordination (UNDAC), European Commission Humanitarian Office (ECHO), United States Agency for International Development (USAID), Emergency Telecommunications Cluster (ETC), NetHope, International Federation of Red Cross and Red Crescent Societies are only a few of the many organizations that utilize assessment teams. It is beyond the scope of this thesis to attempt to describe what each does so the goals of a few are described. These teams primarily use ICT and information sharing as a means to provide service internally but do not address them as a direct problem to solve.

1. United Nations Disaster Assessment and Coordination

The UNDAC organization is part of the international emergency response system for sudden-onset emergencies. Assessment, coordination and information management are UNDAC's core mandates in an emergency response mission. Specifically, in response to earthquakes, UNDAC teams set up and manage the On-Site Operations

Coordination Centre (OSOCC) to help coordinate international Urban Search and Rescue (USAR) teams responding to the disaster—essential if USAR assistance is to function effectively (UNDAC, 2012).

2. International Federation of Red Cross and Red Crescent Societies

International Federation of Red Cross and Red Crescent Societies (IFRC) utilize Field Assessment Coordination Teams (FACT) as a vital part of their global emergency response tools comprised of experienced Red Cross Red Crescent disaster managers who support National Societies and IFRC field offices to respond to disasters. FACT team members have technical expertise in relief, logistics, health, nutrition, public health and epidemiology, psychological support, water, sanitation, finance, and administration, as well as language capabilities. FACT is on standby and can be deployed anywhere in the world within 12–24 hours, for a period of 2 to 4 weeks. These teams provide support to National Red Cross and Red Crescent Societies during the emergency phase of a response operation, which allows operations to begin while long-term support is mobilized (Field Assessment Coordination Teams, 2012).

3. Industry

A unit of the Swedish company Ericsson is specifically dedicated to working in austere conditions and disaster response scenarios. Their expertise, and other companies like theirs, can be used to rebuild critical infrastructure and return an operable network back into operation. This solution may be preferable in situations where damage is limited and there are sufficient personnel with the requisite knowledge to build the infrastructure, since building more permanent locations can mean implementing a solution that will remain after the disaster response phase is complete (Ericsson Response Program, 2012).

4. World Food Program

The World Food Program (WFP) manages the UN Emergency Telecommunications Cluster (ETC) that conducts very basic assessments of security and data telecommunication needs but only for the humanitarian community (Clusters, UN

agencies, NGOs), and not the rest of the global early responder community. These assessments are conducted using their Data Communications Assessment, Capacity Planning and Status Report (Appendix A). These ETC services will be provided in defined 'common operational areas', i.e., areas in which a majority of UN agencies and NGOs are present. Such areas are generally defined through an assessment, approved by the Country level Humanitarian Country Team (HCT), and formally requested by the Resident Coodinator (RC)/Humanitarian Coordinator (HC) (ICT in Emergencies, 2012).

B. EXISTING NON-ICT RELATED ASSESSMENT TEAM PROCEDURES

1. Humanitarian Aid and Civil Protection Department of the European Commission

Humanitarian Aid and Civil Protection department of the European Commission (ECHO) uses an initial needs assessment checklist (INAC) (Appendix B). This checklist evaluates five main sectors using a seven-step process. The five sectors are the following.

- Health
- Food
- Nutrition
- WASH—Water, Sanitation and Hygiene
- Shelter and NFIs—Non-Food Items
- Protection

The seven steps involved in the evaluation are to observe conditions, with regard to the five sectors. Next comes consultation of key informants noting their name and contact data. The assessors then visit facilities, such as healthcare, water and sanitation, schools, potential campsites and markets. Then, the assessors visit households in an attempt to consult men, women and children and ascertain the effects of the disaster on them, as well as the condition of the living space itself. The assessors subsequently conduct an analysis based on information of the current situation. Afterwards, the team members ascertain what actions are needed and prioritize those actions. Lastly, the team members create thresholds and standards applicable to the current situation. All these

steps are done for each sector to determine what rapid response is necessary in the first few days following a crisis. This approach allows for first hand observations using a critical eye from a non-affected party.

The INAC is a tool for the ECHO first responders to disasters yet no direct assessment of ICT status or need exists. During the sixth step, ascertaining actions needed, team members are briefly guided to consider information and communication needs but it is not listed as a key observation point during the observation and consultation steps in the process. Appendix B provides a description of the ECHO INAC.

2. Télécoms Sans Frontières

Télécoms Sans Frontières (TSF) is an NGO that provides emergency telecommunications centers for emergency responders and the indigenous population affected by the disaster. These communications centers provide an opportunity for the affected population to place a phone call to friends, family or required services. Additionally, these centers make broadband Internet access, voice communications, fax lines and the necessary IT equipment available free of charge to emergency responders, NGOs, local authorities and UN agencies. The average length of a TSF deployment is 45 days at which time the telecommunications infrastructures are reestablished, UN agencies and relief organizations set up their own communications or a handover to another organization for longer-term management occurs (Telecoms Sans Frontiers, 2012).

TSF does assist local governments and emergency response coordinators to conduct ICT assessments using rapid response teams. TSF uses its ICT experience to assist in reestablishing commercial networks or in planning to build the ICT support infrastructure needed for the recovery stage following an emergency (Telecoms Sans Frontiers, 2012).

TSF does not supply its assessments to the global community. The assessments conducted are supplied to the local or affected government, and on occasion, to the UNDAC.

3. United Nations Joint Logistics Center

In case of a major disaster with substantial humanitarian multi-sectorial involvement during the immediate relief phase, the UN maintains a capability for joint operations that its agencies may consider. The UN can establish a joint logistics center to promote rapid response, better coordination, and improved efficiency of the humanitarian operation at hand. Many examples can be drawn from past experiences of extensive interagency coordination and collaboration in large-scale emergencies. The success of these experiences has, in part, been due to the ability of the involved agencies to maintain a certain degree of flexibility in establishing joint operations. Nevertheless, the ad hoc establishment of such joint logistics centers suffers from lack of an agreed upon concept, terms of reference, procedures, trained staff and, in some cases, adequate communications and office equipment (UNJLC, 2003).

As a stand-by capacity, the United Nations Joint Logistics Center (UNJLC) can facilitate, if required, the timely activation and deployment in the field of a Joint Logistics Center (JLC). The UNJLC supports the UN agencies and possibly other humanitarian organizations that operate in the same crisis area. The capacity includes the option to establish satellite JLCs dispersed at critical locations in the theater of operations and offers logistics support on a reduced scale. The Field Operations Manual (FOM) contains Terms of Reference (TOR), Procedures and Checklists for operating a UNJLC (UNJLC Field Operations Manual, 2003). The JLC uses flyaway kits that allow the UNJLC to be self-supporting as a logistics planning and operations center in an austere environment. The flyaway kits could be tailored to meet the needs of an ICT assessment team, and Appendix D provides an example of these kits.

The UNJLC is activated in accordance with the guidelines in Annex D UNJLC FOM. Upon activation, agencies establish a Deployment Requirements Assessment (DRA) team to conduct a quick evaluation of the logistics situation and determine the requirements to deploy the UNJLC in the crisis area. This DRA team works in close coordination with the humanitarian authorities and, if deployed, with the UNDAC team and takes all necessary measures for installing the UNJLC and draft an Ad Hoc Terms of Reference (TOR) for endorsement by the relevant humanitarian authorities. In case of

peacekeeping operations or in a complex environment (military personnel are on the ground in a non-peacekeeping capacity), the UNJLC activation is coordinated with the Department of Peacekeeping Operations (DPKO) or the relevant military entities. Upon specific request, the UNJLC makes detailed assessments of roads, bridges, airports, ports and other logistics infrastructure and recommends actions for repair and reconstruction; it does not provide ICT specific assessments to the global community (UNJLC, 2003).

III. ASSESSMENT TEAM COMMUNICATIONS EQUIPMENT

For most types of disasters, at least for the first several days after the event, the communications infrastructure is often dramatically degraded. The following situations are typically found.

- Minimal or no power
- Degraded or overwhelmed telephony services
- Degraded Push-To-Talk (PTT) radio communications
- Minimal or no radio interoperability
- Overwhelmed satellite phone (SatPhone) services
- Not enough satellite equipment and/or oversubscribed services
- Limited Internet access
- Few information technology resources available

The extent of communications degradation can be extensive. The affected area can be extremely large, spanning multiple nations (for example, the 2004 Southeast Asian tsunami). The loss of communications can also be inconsistent. For example, during the 2010 Haitian Earthquake response, daily periodic blackouts of cellular communications occurred. In the aftermath of the 2011 Japan earthquake, some volunteers had working Internet connections but no cellular phones while others had working cellular phones but no Internet connectivity (Nelson, Steckler, & Stamberger, 2011).

To address this unpredictable communications landscape, early responders must bring in their own ICT capabilities. For rapid deployment in the immediate aftermath of a disaster, the ICT should conform to the following constraints.

- Small and lightweight. Disaster responders must often physically carry equipment into hard-to-access areas, which requires portable equipment.
- Commercially available, non-military grade. Many responders are budget-constrained, which makes it critical that communications equipment be easily obtained off-the-shelf instead of military equipment that can be expensive and hard to obtain outside of government channels.

- Energy independent. Power infrastructure may be significantly degraded, which requires early responders to supply their own power. Since generator fuel can be difficult to obtain in disaster zones, non-fossil fuel power generation can also be an important consideration.
- Flexible. Disaster zone environments can change rapidly, and responders may need to adjust the capabilities to match the current needs. For example, systems that use 3G/4G cellular service and traditional Internet service providers will have greater flexibility.

ICT capabilities must allow responders to communicate within the disaster zone, reach back to supporting organizations outside of the affected region, and interoperate with other responding agencies. To operate most effectively and take advantage of the globally available resources requires phones, radios, Short Message Service (SMS), email, data sharing, access to incident management tools, Geographic Information System (GIS) information, social media and many other tools and applications. Many of these capabilities rely heavily on Internet access requiring responder agencies to supply their own Internet connectivity until pre-existing infrastructure is restored, which may require ICT architecture as extensive as the following.

- Satellite connection to the Internet
- Meshed Wireless Fidelity (Wi-Fi) for wireless Internet coverage
- Worldwide Interoperability for Microwave Access (WiMAX) to tie Wi-Fi mesh networks together, connect to nearest surviving infrastructure, and share limited satellite services
- Voice over IP (VoIP) technologies
- Push-To-Talk radio equipment
- Ultra high Frequency/Very High Frequency/High Frequency (UHF/VHF/HF)
- Radio over IP (RoIP) equipment that facilitates radio interoperability
- Standard Internet tools, such as email, web access, and video, to provide situational awareness and collaboration

Additionally, a need exists for an ICT model to deploy an effective, stable, sustainable, portable, IP-based communications infrastructure. Nelson, Steckler and Stamberger (2011) provide a Hastily Formed Network (HFN) model that could support such requirements.

The assessment teams need to be prepared to be self-sufficient while conducting assessments. Some of the necessary components for an assessment team to consider bringing into a disaster area are cellular communications, IP access points, power and Wi-Fi.

A. CELLULAR

1. Phones

Existing, intact, cellular infrastructure following a disaster, if not inundated with traffic could provide the assessment teams what is necessary for operational communication. If the infrastructure and bandwidth needed are available, the assessment teams would need phones designed to work with the type of cellular network in place. This seldom occurs. Yet, let us explore, how cellular communications typically occur. The two most widely used network structures are Global System for Mobile communications (GSM) and Code Division Multiple Access (CDMA).

a. Global System for Mobile Communications

Global System for Mobile communications (GSM) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM supports voice calls and data transfer speeds of up to 9.6 kbps, together with the transmission of Short Message Service (SMS). Terrestrial GSM networks now cover more than 90% of the world's population. GSM satellite roaming has also extended service access to areas in which terrestrial coverage is not available (Mobile Technology, 2012).

b. Code Division Multiple Access

Code Division Multiple Access (CDMA) is a "spread spectrum" technology that allows many users to occupy the same time and frequency allocations in a given band/space. CDMA assigns unique codes to each communication to differentiate it from others in the same spectrum. In a world of finite spectrum resources, CDMA enables many more people to share the airwaves at the same time than do alternative technologies (CDMA Technology, 2012).

2. Portable Wi-Fi Hotspots

A portable Wi-Fi hotspot allows portable IP devices (phone, computer, tablet, etc.) to share a data connection over cellular wireless network infrastructure. If implementing this type of system, it is prudent to research the local cellular carrier-pricing schedule as many offer data plans that have restrictions to the amount of traffic allowed before being bandwidth throttled or charged high rates after reaching a pre-determined data threshold. The convenience and flexibility of a portable hotspot may outweigh the expense and burden of carrying the additional *appliance or gadget*.

B. IP ACCESS POINT

1. BGAN

The Inmarsat service called Broadband Global Area Network (BGAN) was created in 2006 to replace a regional network called RBGAN that provided a reduced bandwidth service from 2002 to 2008. The latest BGAN devices are designed to be transported by a single person and to be able to connect to a satellite within minutes. It is an ideal solution for a first response team because of its lightweight, speed, and ease of use. The BGAN is ruggedized and some models, such as the Hughes 9201 (Figure 1) and Thrane/Thrane 700 (Figure 2), also possess the built-in ability to broadcast a Wi-Fi signal within a 100 meter circumference area. Inmarsat does not produce the devices that connect to their service, but numerous options exist on the market designed to access the Inmarsat network.

Figure 1. Hughes 9201 Inmarsat Terminal (From: Hughes, 2012)

Figure 2. Thrane/Thrane 700 Explorer (From: EXPLORER 700, 2012)

An additional feature of the BGAN is its ability to designate the speed of the connection when first synchronized to the satellite, which can be seen as both an advantage and a disadvantage. The user does not necessarily get the best speed all the time but will know the exact speed of the BGAN connection. Generally, these devices are designed to withstand severe environmental conditions, such as humidity, dust, extreme weather and changing temperatures. The BGAN does have some drawbacks and limitations. First, it is required to run on Subscriber Identity Module (SIM) cards. The SIM cards are only good for a designated amount of download bandwidth and can be used up quickly that thus creates a need to carry multiple SIM cards each time the BGAN is used. Second, the cost to use the device could be much greater than Very Small Aperture Satellite Terminals (VSAT), see section 2, because they are based on data usage versus flat monthly fees. Lastly, the BGAN relies upon Line of Sight (LOS) to the satellite and when deployed in metropolitan areas with tall buildings or in mountainous areas with large mountains or trees, it can be difficult to establish and maintain connections. BGAN provides worldwide coverage as shown in Figure 3 (INMARSAT, 2009).

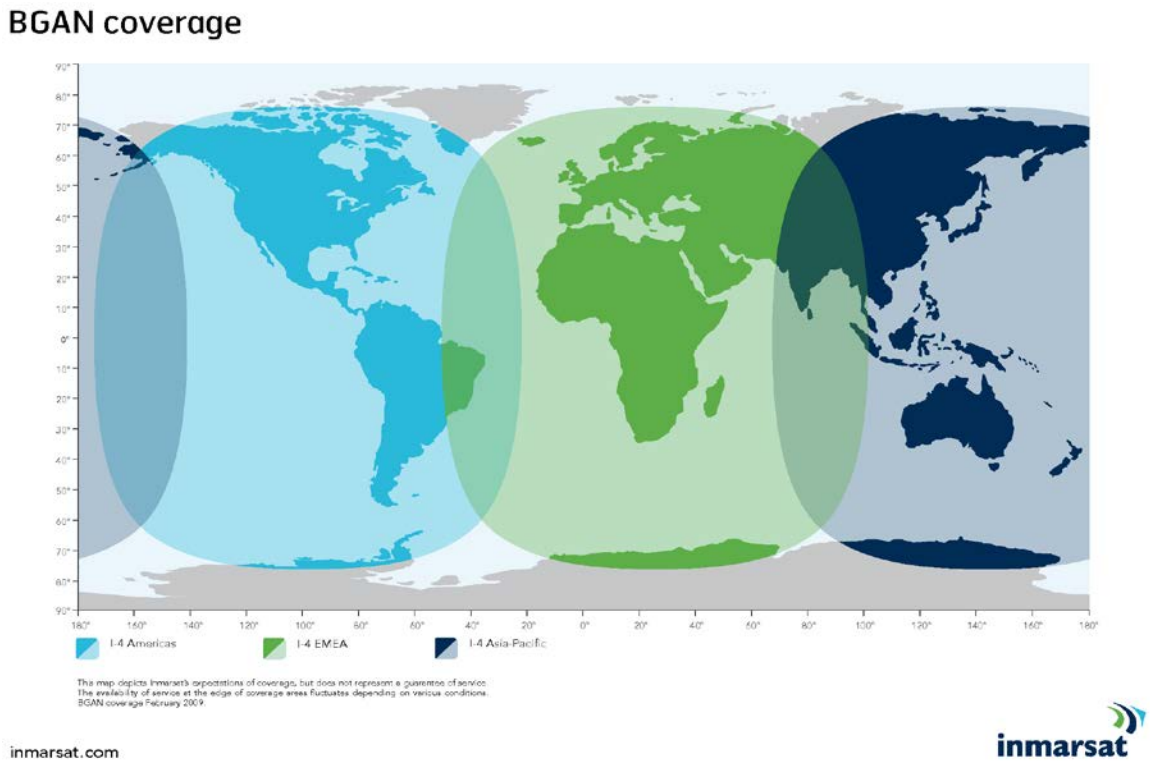

Figure 3. Inmarsat BGAN Satellite Coverage (From: Hughes, 2012)

2. Very Small Aperture Satellite Terminals

Very Small Aperture Satellite Terminals (VSATs) differ in size and weight but can handle several types of different bands (X, C, Ka, and Ku) and can connect to an array of satellites. The VSATs are typically built with ease of use and portability in mind. Although it is neither as small nor as user-friendly as the BGAN, it is simple in nature to connect to a satellite to establish the gateway for a link to the Internet. The BGAN requires the user to establish a connection to another terminal or agency that operates the respective satellite.

VSAT is generally less portable than BGAN units, and provides more bandwidth for a fixed cost. As such, the BGAN unit may be better suited for small assessment teams not sharing or receiving communication resources. The VSAT may be more appropriate for follow on reporting and support for larger or longer-term deployment teams.

C. POWER

Power is a major concern for any equipment planned to be deployed into remote areas. Solutions vary from batteries to solar to generators to existing infrastructure at the HA/DR site. Each power solution has concerns and possible limitations that must be considered when planning to communicate. We will now discuss and compare some different power methods.

1. Battery Power

Batteries offer a very attractive solution to the mobile user. A battery solution allows the typical Fly Away Kit (FLAK) to move freely without the hindrance of being tied to a stationary power source. However, a power inverter is required to support the FLAK in its current state. DC versions of equipment used in the typical FLAK are available, but it is easier to use the standard equipment with batteries and an inverter. This type of implementation supports operating from common vehicle batteries.

2. Solar Power

A solar power solution can be used in conjunction with a battery solution. Items to consider when using solar power are size, weight, preventive maintenance, rigid panels and flexible or foldable solar solutions. A large solar installation may weigh several hundred pounds and require a large space. Commercially available, portable solar solutions are available as well but are limited in their ability to provide enough charge in a high power demand system. Not being dependent on AC power is this solution's obvious advantage. Solar power is particularly beneficial in a remote emergency situation. The SolarStik system (Figure 4) has been designed to be less than 100 pounds per piece such that it can be checked as baggage on commercial airlines.

Figure 4. SolarStik Nano (From: SolarStik, 2012)

3. Generators

Generators are available with a variety of fuel options. Solutions include, but are not limited to gasoline, diesel, and hydrogen fuel cell. Each type of generator has advantages and disadvantages for deployable teams in HA/DR environments that must be considered based upon the situation.

a. Gasoline

Modern gasoline generators (Figure 5) are produced by many companies and offer very efficient power solutions. Table 1 provides the specifications for the Honda EU2000i. Advantages for this type of power solution include the following.

- Lightweight
- Compact
- Quality power output
- Low fuel consumption
- Quiet operation

Figure 5. Typical Portable Gasoline Generator (From: Honda, 2012)

Honda EU 2000i	
Engine	Honda GX100
Displacement	98.5cc
AC Output	120V 2000W max. (16.7A) 1600W rated (13.3A)
Receptacles	20A 125V Duplex
DC Output	12V, 96W (8A)
Starting System	Recoil
Fuel Tank Capacity	1.1 gal
Run Time per Tankful	4 hrs. @ rated load, 9.6 hrs. @ 1/4 load
Dimensions (L x W x H)	20.1” x 11.4” x 16.7”
Noise Level	59 dB(A) @ rated load 53dB(A) @ 1/4 load
Dry Weight	46.3 lbs.

Table 1. Honda EU200i (From: Honda, 2012)

The greatest disadvantage of this power source is probably the requirement for gasoline in remote or disaster stricken areas where fuel for the generator itself may not be available. Environmental conditions can affect the feasibility of refueling generators as well.

b. Diesel

Diesel generators (Figure 6) are common industrial type solutions. These generators are large, heavy, and require more resources to transport. Most diesel generators support tens of kilowatts or more and would supply more than enough power for the ICT solutions an assessment team would need. An additional advantage is the availability of diesel in the HA/DR environment. A large amount of military equipment is reliant on diesel power that could increase the availability of diesel in an environment in which other fuels are not available.

Figure 6. Typical Portable Diesel Generator (From: Dobler, 2008)

c. Hydrogen Fuel Cell

SolarStik provides an alternative fuel source (Figure 7) that could provide power of 600 to 2200 watt hours per day via battery charging (Table 2) but it also has its disadvantages as it can bulky and difficult to transport, as well as the batteries that would be needed to store the energy it produces. Hydrogen fuel is not likely readily available to recharge power cells in a HA/DR environment and would need to be resupplied if enough fuel could not be hand carried. Transportation and supply of the fuel source can be a

major impediment to this type of solution. The generator marketed by SolarStik is actually manufactured by Energy for You (EFOY). To maintain the warranty and extend the service life of the generator, EFOY requires the methanol fuel source be purchased in their proprietary containers (EFOY, 2012). Methanol is considered a hazardous material. Thus, shipping and refueling would be a challenge to consider before choosing this alternate power source.

Figure 7. Hydrogen Fuel Cell (From: SolarStik, 2012)

Case	Pelican™ 1740
Fuel Type	Methanol
kW h per Gallon	4 kW h per single US Gal (1.06 kW h / L)
Fuel Cartridge Compatibility	M5 or M10 Methanol Cartridge
Compatible batteries	12V /24V lead rechargeable (lead-acid, lead-gel or AGM)
Breaker	20A Master breaker switch
Operating Temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Life Expectancy	2000 hours
Venting	Normally aspirated
Programmable Control	Yes
Remote Monitoring Data Interface	RJ-45 plug
Recommended Altitude	5,000 ft (1,524 m)
Required Start-up voltages for 12V DC	10.5V DC
Required Start-up voltages for 24V DC	21.0V DC
EFOY SFC Fuel Cell	CE-Listed

Table 2. SolarStik Pro Cell 600 (From: Pro Cell, 2012)

d. Other Generators

Other solutions for generators include natural gas, propane, and tri-fuel generators. Natural gas and propane generators are more commonly found as fixed installations for backup power solutions. Tri-fuel generators are similar to the gasoline models described previously. The success of all generator solutions are subject to the availability of fuel in the HA/DR area.

D. LOCAL INTERNET

Once a connection has been established locally, the desire is to distribute this connection to other networks and users, which is commonly referred to as “the last mile.” Solutions include 802.11 Wi-Fi, 802.16 WiMax and meshed Wi-Fi.

1. Wi-Fi

Wi-Fi (802.11) exists as a possible means for last mile extensions. It was not inherently designed to perform over large distances, but has the ability to provide wireless connection options including client/host, peer-to-peer (ad-hoc), point-to-point,

point to multi-point, site-to-site bridge, or last mile connections. WiFi is a direct sequence spread spectrum solution that operates in the 2.4 and 5.8 GHz frequency range. Multi-path interference and unintentional jamming can cause significant problems for a WiFi solution. An in depth description of Wi-Fi is beyond the scope of this thesis.

2. WiMAX

Worldwide Interoperability for Microwave Access (WiMAX) is a wireless communication system (Figure 8) that allows computer and workstations to connect to high-speed data networks (such as the Internet) using radio waves as the transmission medium with data transmission rates that can exceed 75 Mbps for each radio channel.

Figure 8. WiMAX (From: WiMAX Apps, 2012)

This system uses orthogonal frequency division multiplexing (OFDM), which provides resilience to multipath and noisy environments. WiMAX or 802.16 offers non-line of sight abilities and can be used as a robust solution for last mile implementations. A detailed description of WiMAX is beyond the scope of this thesis.

3. Meshed Wi-Fi

A meshed Wi-Fi network consists of wireless access points meshed to provide efficient local transmission, and a variety of transmission and backhaul solutions to provide connectivity to the public access gateways. Meshed Wi-Fi covers a large area (relative to conventional Wi-Fi) with each access point and provides a cost-effective backhaul using the wireless meshing technique. Mesh networking extends typical Wi-Fi networks by using multiple low-cost 802.11 radios as routing nodes that pass data among themselves and require far fewer backhaul connections. In mesh network architecture, Wi-Fi access points act as transmission nodes to provide short-haul connectivity back to centralized transmission connection points within the vicinity of the Wi-Fi nodes. Meshed Wi-Fi is not a standalone solution; rather, it is a component of a total Wi-Fi networking solution (Wiggins, 2006).

IV. AREAS OF ICT ASSESSMENT FOCUS

The global audience to which the assessment teams will provide their assessements each use varying ICT equipment and networks. The assessment teams must focus on all aspects of communication and their supporting infastructure to ensure the end users of their assessements are provided the tools necessary for decision making in their relief efforts. To provide this ability to the relief agencies that follow an assessment of a disaster, the teams must, at a minimum, consider power, cellular, satellite, radio frequency, and ground-based communications.

A. CELLULAR COMMUNICATIONS

1. Global System for Mobile Communications

Global System for Mobile communications (GSM) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM supports voice calls and data transfer speeds of up to 9.6 kbps, together with the transmission of Short Message Service (SMS). Terrestrial GSM networks now cover more than 90% of the world's population. GSM satellite roaming has also extended service access to areas in which terrestrial coverage is not available (Mobile Technology, 2012).

2. Code Division Multiple Access

Code Division Multiple Access (CDMA) is a "spread spectrum" technology that allows many users to occupy the same time and frequency allocations in a given band/space. CDMA assigns unique codes to each communication to differentiate it from others in the same spectrum. In a world of finite spectrum resources, CDMA enables many more people to share the airwaves at the same time than do alternative technologies (CDMA Technology, 2012).

3. Cellular Organization

The assessment must identify what or who are the responsible parties for the cellular network and regulations that apply. An understanding of the system with no understanding of the authorities would make the assessment useless to any entity wishing

to utilize or assist in the recovery of such a system. A cellular system could be regulated by local government yet run by industry, which is an important point to note in the assessment so the correct entities can be negotiated with before relief parties attempt to utilize the infrastructure.

B. SATELLITE COMMUNICATIONS

The ICT assessment teams may not be the first responders to reach the area. If this is the case, other responders will undoubtedly bring with them some method of communications and it will be important to capture what their method, capacity and willingness to provide services to others will be. In many cases, other aid organizations will bring either BGAN or VSAT access points. Therefore, an understanding of the capabilities and limitations of those devices would be required for a complete assessment picture. Chapter IV provides a description of BGAN and VSAT.

C. RADIO FREQUENCY COMMUNICATIONS

1. VHF

Very High Frequency (VHF) is conventionally defined as a portion of the electromagnetic spectrum that includes any radiation with a wavelength between 1 and 10 meters and a frequency between 300 and 30 megahertz. VHF signals are widely employed for television and radio transmissions. This means of communication is important to assess as most FM radio stations and many amateur radio operators transmit on frequencies within the VHF band (VHF, 2012).

2. UHF

Ultra High Frequency (UHF) is the conventionally defined portion of the electromagnetic spectrum that encompasses radiation having a wavelength between 0.1 and 1 m and a frequency between 3,000 and 300 megahertz. UHF signals are used extensively in television broadcasting, ship and aircraft navigation systems and radio communications. UHF waves are very weakly reflected by the ionized layers of the upper atmosphere. Therefore, unlike longer waves, they bend very little around the curvature of

the earth and are easily obstructed by tall buildings and mountains. They can, however, be concentrated into narrow, highly directional signal beams. These characteristics make UHF suitable for line-of-sight applications that require high accuracy (UHF, 2012).

D. GROUND BASED COMMUNICATIONS

1. Transmission Medium

The HA/DR ICT status assessment must identify of what the ground-based communications infrastructure consist, which could be copper or fiber optic cables, and should identify their condition before and after the disaster as well. Additionally, if the original infrastructure is incapacitated, a temporary medium may be in place or the potential to utilize parts of the original system to implement a temporary solution.

a. Digital Subscriber Line

Digital Subscriber Line (DSL) is a high-speed connection that uses the same wires as a regular telephone line (Figure 9). Some characteristics of DSL are as follows.

- Simultaneous IP and voice over the phone line
- Speed is much higher than a regular modem
- DSL does not necessarily require standalone wiring; it can use existing phone lines
- A DSL connection works better when closer to the provider's central office. The farther away from the central office, the weaker the signal becomes.
- The connection is faster for receiving data than it is for sending data over the Internet.

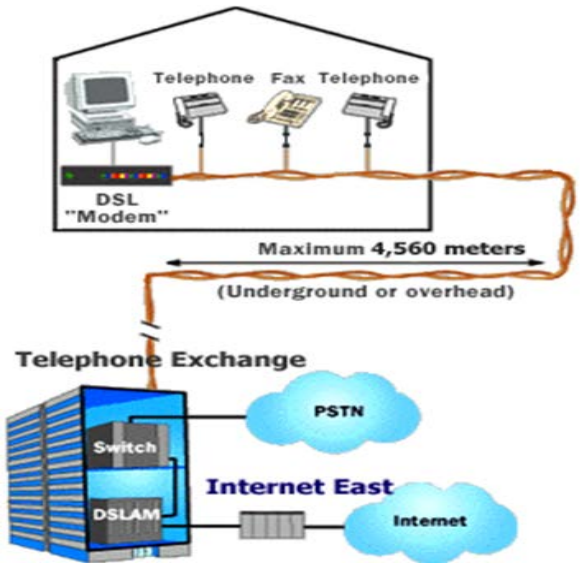

Figure 9. DSL Network (From: How DSL Works, 2005)

b. Cable

Cable television signals are given a 6-megahertz (MHz, millions of cycles per second) channel on the cable. The coaxial cable used to carry cable television can conduct hundreds of megahertz of signals. In some systems, coaxial cable is the only medium used for distributing signals. In other systems, fiber-optic cable goes from the cable company to different neighborhoods or areas. Then, the fiber is terminated and the signals move onto coaxial cable for distribution to individual houses.

Internet access over the cable can use the same cables because the cable modem system puts downstream data, data sent from the Internet to an individual computer, into a 6-MHz channel. On the cable, the data looks just like a TV channel. Therefore, Internet downstream data takes up the same amount of cable space as any single channel of programming. Upstream data, information sent from an individual back to the Internet, requires even less of the cable's bandwidth, just 2 MHz, since the assumption is that most people download far more information than they upload.

Putting both upstream and downstream data on the cable television system requires two types of equipment, a cable modem on the customer end and a cable modem

termination system (CMTS) at the cable provider's end. Between these two types of equipment, all the computer networking, security and management of Internet access over cable television are put into place (Broadbandinfo, 2012).

c. T1

A T1 line is either a fiber optic or copper line that can carry 24 digitized voice channels, or data at a rate of 1.544 megabits per second. If the T1 line is being used for telephone conversations, it plugs into the phone system. If it is carrying data, it plugs into the network's router. A T1 line can carry about 192,000 bytes per second, roughly 60 times more data than a normal residential modem. It is also extremely reliable, and much more dependable than an analog modem. Depending on what they are doing, a T1 line can generally handle quite a few people. For general browsing, hundreds of users are easily able to share a T1 line. If they are all downloading MP3 files or video files simultaneously, it would be a problem, which is not very likely in most situations but depending on who will be using such a system in a disaster relief situation, it may become a consideration (T1, 2012).

d. Integrated Services Digital Network

Integrated Services Digital Network (ISDN) is a system of digital phone connections compatible with an existing (analog) telephone system. ISDN can be used to make conventional (analog, dialup) voice connections. In addition, ISDN can be used to make high-speed digital data connections with other ISDN capable users.

ISDN allows data to be transmitted and received around the world using end-to-end digital connectivity. With ISDN, 64Kbps bearer channels (B channels) carry voice and data. Multiple B channels can cooperate to provide higher data rates. Common ISDN installations can easily be configured to use two (2) B channels, which provide a true data rate of 128Kbps. In all ISDN installations, a data channel (D channel) handles control signaling at 16 kbps or 64 kbps, depending on the service type (ISDN, 2012).

2. Availability and Restrictions

Voice and data transmission requirements can be different. Thus, this part of an ICT assessment should rate what can be supported, as well as the limiting factors. Additionally, it will be necessary to determine the governing parties to the network. It is not uncommon to have government regulated transmission lines run by private industry. A baseline assessment conducted pre-disaster will identify those relationships and key points of contact to arrange for clearance for use in a relief situation.

The assessment should consider backhaul infrastructure as well. In some areas, microwave transmission is used as a backhaul and then converted to copper, fiber, cellular or Wi-Fi for consumer access. If the backhaul infrastructure is damaged or susceptible to damage from follow-on incidents, such as aftershocks, it should be considered in the assessment. If the backhaul medium becomes inoperable, considerable value may be placed in the existing consumer delivery system with respect to restoring a disaster communications network. Again, it will be important to determine who is responsible for each aspect of the pre-disaster network and gather key contact information in the event these resources are needed.

E. POWER

Regardless of which methods of information and communications are directly impacted in a disaster, aside from pen and paper, all forms of communication have one thing in common, power. History has shown that without power, technology is nothing more than a memory or a goal. For example, following the March 11, 2011 Japan Tohoku Region Earthquake and Tsunami, ICT network recovery was hampered by the network dependence on power grids and transportation infrastructure (Kwasinski, 2011). ICT assessment teams must provide an assessment of the power available within a disaster area to provide responders with the decision-making tools necessary to provide relief effectively. To supply this information, assessments should include power sources, distribution points and the infrastructure that supports them.

1. Source

The power source should be identified to indicate what is stable in both the long and short term. If the power source is coal, yet the railway or roads that supply the power plant are destroyed, the source of power may be only as substantial as the reserves on hand. Additionally, the source must be evaluated with regard to its attributes. If the source is nuclear power, who is certifying that the plant is in stable, usable condition and where is the plant located? If the source is hydroelectric power, is the water source in danger of debris contamination that could impede the power generation?

2. Distribution Points

The assessment should note how many distribution points are functional and the type of distribution used, such as underground or suspended power lines. The condition of the transmission lines and related infrastructure should be evaluated to determine stability of customer power. What method is available to bring existing power to relief groups? Is the government or local industry providing a method to utilize available power and at what cost?

3. Infrastructure

The assessment should identify who is responsible for the distribution of power, which could be government owned transmission lines supplied from industry owned power sources. In this sort of situation, both must be analyzed and included in assessments for planning needs. Points of contact for each should be provided in the assessment so follow on users would know how to arrange for services.

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V. ASSESSMENT TEAM DYNAMICS

A multi-organizational ICT assessment team does not exist and should therefore be created in a manner to afford the experts in each field the ability to provide the best assessment possible. The organization may evolve into something different but that should be a decision made by the members who put forth the initial effort to lay the groundwork. To facilitate the creation of such an organization, some basic organizational dynamics initially in place are needed. A few recommended considerations for the initial construct are organizational considerations, working groups and assessment team roles and responsibilities.

A. ORGANIZATIONAL CONSIDERATIONS

1. Coordinating Unit

A coordinating unit is an arrangement in which several organizations agree to have some of their activities coordinated by a separate but shared unit to achieve a common mid-term goal. Figure 10 provides a visual depiction of the interconnectivity.

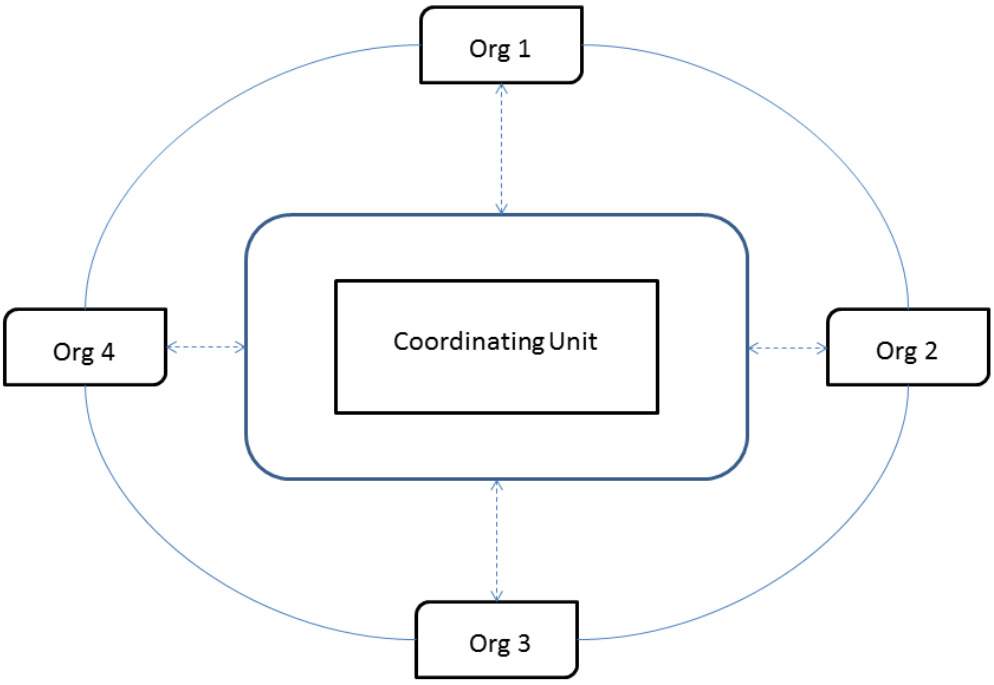

Figure 10. Coordinating Unit

Many organizations converge on an area when relief is needed and have the intention but not the ability to coordinate efforts. To maximize the benefit, or at least minimize the wasting of resources, a unified effort is needed to facilitate a command and control structure. Sharing information among assessment teams and the larger organizations they serve is critical toward coordinating a response. For information sharing to occur effectively, information reporting and dissemination methods must be identified and managed by agreed upon standards.

HA/DR operations typically require contributions from a diverse pool of actors. NGOs, the DoD, the DoS, foreign governments, private citizens, corporations, local partners, and aid recipients are all actors who can play roles in the humanitarian aid supply chain. Figure 11 shows a macro view of the network of disaster relief providers. The lack of agility is not the only problem that actor diversity causes for HA/DR operations. Problems of trust and communication (Tatham & Kovács, 2010), coordination (Lawlor, Kraus, & Kwast, 2008), responsibility handoffs (Pettit & Beresford, 2005; Henderson, 2007), consistent management practices, failure to incorporate lessons learned, inventory management, and information management (Apte, 2009) are just a few examples showing the complex nature of the humanitarian aid network. Figure 11 shows the complex nature of the humanitarian aid network.

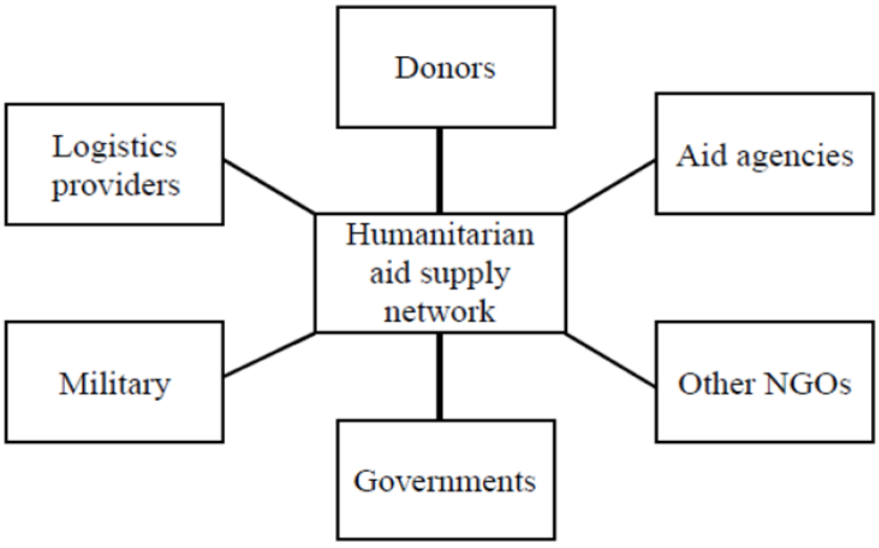

Figure 11. HADR Network Actors (From: Kovacs & Spens, 2007)

"Transitioning from emergency ICT to recovery ICT requires a process for migrating from temporary ICT to a phase that rebuilds the permanent ICT infrastructure" (Nelson, Steckler, & Stamberger, 2011). To accomplish this transition, an effective command and control (C2) structure must be in place that the coordinating unit can provide.

Creating a scalable ICT assessment team comprised of many organizations from different nations, backgrounds and business models requires a central point to resolve issues and build standards. The UN is well suited to take on this roll as coordinating unit. Many assessment teams already exist under the UN umbrella; therefore, an ICT assessment team can benefit from the overhead already in place.

2. Assessment Team Technical Advisory Board

A need will likely arise for a technical advisory board. The main activities that the technical advisory board would conduct include advising the Board of Directors on the assessment team standards, maintaining documents relating to the assessment team standards, developing methodologies for certification and accreditation, reviewing the progress of assessment team certifications, and providing advice on these areas.

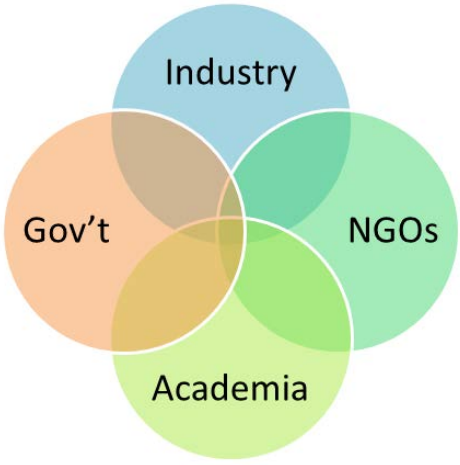

Figure 12. Assessment Team Coordination

3. Assessment Team Board of Directors

The Board of Directors (BoD) would serve to manage the business aspects of the assessment teams, govern the organization, and serve as its accountable body. The board would help create the vision, mission, values, and policies for the organization and ensure they are properly respected. The BoD would facilitate funding, as well as coordinate with industry and government bodies to assist with regulatory needs. Major decisions would be discussed, debated, and finally, decided upon with the technical advisory board's input and recommendations. The board would provide an oversight and evaluation function by keeping everyone well informed about the activities of the organization and communicating appropriate information to the public.

B. WORKING GROUPS

1. Purpose

The purpose of a Rapid Technology Assessment Team (RTAT) working group would be to develop and promote the implementation of a standard tactics and techniques for the ICT assessment teams. The RTAT working group would provide a means for coordinating policy, programs, and budgets among member agencies and with partners in other sectors to include identifying and integrating requirements, conducting joint program planning, and developing joint strategies for training, qualification, and access to disaster areas. The working group should provide for cost-effective cooperation and coordination among agencies, and with the science, technology, and engineering research and development communities, and with partners and counterparts, as appropriate, to identify best practices, to encourage shared solutions to key challenges, and to implement coordinated strategies and policies for assessing ICT resources both before and after a crisis (Harnessing the Power of Digital Data for Science and Society, 2009).

2. Roles and Responsibilities

The goal of the working group is to reach consensus. Thus, each working group member will be expected to do the following.

- Make the best effort possible to reach a consensus
- Share the responsibility of ensuring the success of the process and the quality of the outcome
- Keep the working group informed regarding constraints on a decision-making authority on behalf of said agency
- Keep the agency informed about the perspectives, concerns and interests of the working group
- Actively participate in discussions
- Bring concerns to other members or facilitators
- Share the airtime with others
- Have respect for different points of view and be attentive when others speak
- Ask questions of each other for clarification and mutual understanding
- Verify assumptions when necessary
- Avoid characterizing the motives of others
- Acknowledge and try to understand other's perspectives
- Deal with differences as problems to be solved, not battles to be won
- Stay focused on the task at hand
- Refrain from distracting others through side conversations

C. ASSESSMENT TEAM ROLES AND RESPONSIBILITIES

1. Operational Responsibilities

The assessment teams could consist of small two to three person units with diverse backgrounds that would act as early responders to determine the status of ICT in a disaster. These teams could utilize check sheets that guide a standardized assessment covering areas in which each two or three person team may not have expertise. Figure 13 shows the pool of expertise that an assessment organization could provide. The technical experts could refine the check sheet such that an assessor who has a working knowledge of each system would be able to provide enough information that an expert in that field would be able to make recommendations on the way ahead.

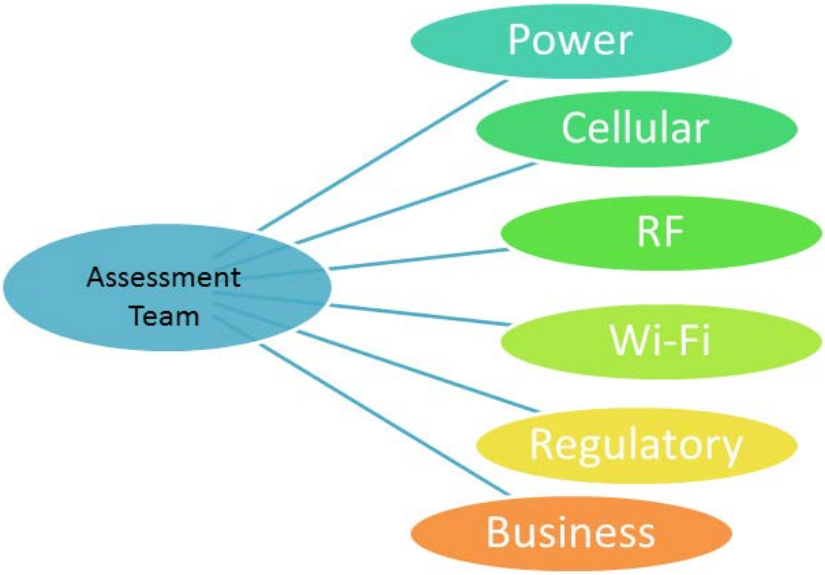

Figure 13. Assessment Team Pool of Expertise

VI. ACCESS TO DISASTER ZONES AND CREDENTIALS

In past crises, local governments have restricted media and aid access to some areas. When this happens, the response to the catastrophe is viewed by many as limited, unplanned, and in some cases, completely lacking in effectiveness. The assessment teams will need to have methods to qualify and certify members recognized by national and international parties. To facilitate access to disaster areas, the organization must consider standardization, training, certification, and credentialing.

A. QUALIFICATIONS

1. Access

To facilitate rapid response, member countries and organizations must come to an agreement on what will be required to facilitate access. Once the member countries and organizations agree, the assessment teams can begin preparing for such occasions.

A well-conceived and executed access program ensures that the right people can quickly enter the right areas, at the right time, to hasten the process of the community's return to normalcy (Hammill, 1999). The quicker the ICT infrastructure is reestablished, the better the opportunity to protect life, business, community, and perhaps, national interests.

The assessment team organization should develop procedures to gain access to disaster areas to facilitate ICT assessments. Prior to team deployment, the local emergency management officials should be provided with and maintain a list of assessment team responders, and more specifically, those assigned to the particular incident. Providing a full list of assessors would allow for additional personnel in the event of last minute changes in assignments or additional needs. The assessment teams must identify what entity will control access to the disaster area (local law enforcement, military or other government agencies).

An access program will support the objective by facilitating the following.

- Establishment of a database of access credential holders
- Creation of a badge with a common design recognized by all states
- Devising guidelines and standards for implementation of the credentialing system

2. Credentials

To verify access, a credentialing agency that will ensure the standards of access are met is essential. The organization should create a single ID badge recognized by state and local law/fire enforcement agencies in the country. The badge should be MANDATORY and contain the following information.

Front:

- Photo of Assessor
- Responding Country
- Name of Individual
- Organization Name
- ID Control Number (unique to each badge)
- Expiration Date (valid for a maximum number of years)
- Possibly the signature of authority named as the accrediting agency

Back:

- Secondary IDs required
- Hard hat, reflective vests (green, yellow, orange), safety shoes
- Access granted at the discretion of the Incident Commander
- Access granted to conduct assessment of ICT only
- Badge is to be used for ICT assessment response only

The credentialing system should:

- Assure that credentials are valid and communicate such to the local officials responsible for command and control of the disaster zone
- Maintain a database of active “badge” holders and contacts. Know who will be responding on the organization’s behalf (responders could conceivably be from outside the affected state)

- Act as the central-point-of-contact and "clearing house" for all ICT assessment teams in the disaster zone
- Assure that the organizations' badge holders assemble at a single location (staging area) either pre-determined or at time of disaster
- Facilitate mandatory classes for those holding credentials (must attend refresher course annually to ensure familiarity with procedures)
- Suggest classes on "basic safety" and "HAZMAT," as deemed necessary

B. CERTIFICATIONS

1. Training

Repetitive training to reinforce familiarity and to maintain skill level is recommended. In designing the training program, consider the following factors that affect training requirements.

- The number of participants in the training program
- The equipment they are expected to use
- Services to be performed
- The anticipated annual assessor turnover rate
- The availability of ongoing in-house technical support
- Quality assurance requirements

Each of these factors will help shape the type of training required. With that said, training should be performed no less than annually. All new assessors should be required to complete an indoctrination program that covers all major training. The output and competence of assessors will increase considerably with an investment in a successful training program.

After the initial training has been completed, it should be reinforced by developing a monthly newsletter or e-mail to reinforce the training and refresh everyone's memory. As the knowledge level of the employees grows, the level of material presented should likewise increase.

2. Standardization

Standardized taxonomy must be established. A unified list of terminology will help prevent misunderstandings and variation in judgment. Setting procedural standards

and agreements in the use of a collaboration workspace and its tools will facilitate a robust network of ICT assessors able to provide input to a common database. In a group-oriented IT platform, in which information and content are open to manipulation by many, the usability is interdependent. Frustration and discouragement would occur if information were inconsistently scattered everywhere or ambiguous. As assessment teams utilize a standardized process, it is less likely that important factors may be forgotten or that confusion may arise between who had responsibility for which elements (Drifmeyer & Llewellyn, 2003).

VII. ORGANIZATIONAL AND OPERATIONAL FUNDING

Creating a multi-organizational assessment team will require funding for the day-to-day administration (organizational funding), as well as equipment and travel costs (operational funding). Multiple funding options exist, each with its own strengths and weaknesses. The assessment team organization should consider gear, travel and cost sharing when deciding on the proper funding model.

A. OPERATIONAL FUNDING

1. Choosing the Gear

Researching and choosing technologies to function with the FLAK to support HA/DR is a dynamic topic as technologies and equipment are ever changing. Each assessment team would be best suited to determine what systems would be included in its flyaway kit based on the situation yet all teams pull gear from a centrally recognized list of equipment tested for interoperability. Appendix E provides a sample list of potential personal and professional gear that may be considered.

2. Travel

Assessment teams may be already in place if the affected area were home base for some assessors. It is likely additional assessors will be necessary from outside the geographic area. Travel procedures for assessment teams will need to be decided for air, land and over sea travel. The assessment organization will need to have travel expenses provided in some pre-arranged manner.

a. Assessment Team Self-funded Travel

The organization may maintain an operational budget to facilitate assessments. Member organizations or those that wish to support the assessment organization could supply funding for this purpose either up front or at the time of a disaster that could require the assessment organization to maintain a revolving account that had substantial funds, as the variation and uncertainty of costs could be great.

b. Travel Grants

The Office of U. S. Foreign Disaster Assistance (OFDA) is part of the U.S. Agency for International Development (USAID)'s Bureau for Humanitarian Response (BHR). On average, sixty percent of OFDA's humanitarian assistance is provided through grants to Private Voluntary Organizations (PVOs)/Non-Governmental Organizations (NGOs). Along with its other partners in the international community and among other USG agencies, OFDA continues to rely on the PVO/NGO community to implement many of its activities (OFDA Guidelines for Grant Proposals and Reporting, 1998).

B. ORGANIZATIONAL COST SHARING AMONG ENTITIES

1. Self-Funding

If the program were created with each member/organization being self-funded, disparity in equipment, accommodations and ability to respond would occur. The resulting impact would negatively affect team cohesion and interoperability. In this funding model, it would be particularly important that the organization reach a decision as a whole as to who would be the best assessors for each particular mission, as well as for what duration the organization was willing and able to fund such an assessment. Any decision made without complete agreement from all member groups would risk the financial support of groups not in agreement.

2. Umbrella Funding

If the program were funded under an umbrella organization, such as the UN, assessment teams would receive funding for all aspects of their work from one organization. Each team would have similar resources available and a unified cost schedule. One risk associated with this method is that the assessment teams may essentially be a part of that umbrella organization and no longer be a consortium of experts from different entities. Another concern would be that if the umbrella organization were not in good standing with the affected country, the assessment teams could be denied the opportunity to provide their services.

3. Sponsored or Donor Funding

The assessment teams could be funded strictly from donor support. The donors could be just about any government, industry or NGO source, and notionally, have no overarching influence on assessment team tactics, techniques or procedures. This funding method essentially creates the assessment teams as their own NGO. A risk associated with this model could be no known lines of funding occur from year to year and could, therefore, place the entire concept at risk of falling apart any time donors were unable or unwilling to support. The assessments could be provided for a fee to organizations not already participating in the assessment organization to offset the cost of travel, equipment and training of assessors.

4. Hybrid Funding Model

Day to day operations could be funded by an umbrella organization, such as the UN. Member organizations could raise funds for an initial operational expense account. Once a disaster occurs, funding requirements would be fulfilled by a request for funding from supporting or member organizations. The risk involved with this model is that operational funding may not be available immediately following a disaster and assessment teams may have to wait to respond until appropriate funding is made available.

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VIII. CONCLUSION

A. DISCUSSION

Information and communication technologies are necessary for smooth and effective humanitarian assistance and disaster relief. No single source exists that evaluates ICT and disseminates that assessment across organizational boundaries from the local government all the way through the foreign NGO. The initial assessment is the common ground that must be reached to save lives and speed recovery. Experts and visionaries within the ICT community utilizing a standardized checklist should conduct the assessment.

B. RECOMMENDATIONS

- Continue the use of working groups to refine the concept and organizational structure in a way that the subject matter experts can best provide assistance.
- Continue to refine and develop the RTAT checklist provided in Appendix F.
- Determine a method to update and standardize assessment team flyaway kits and the necessary training for assessment teams continually.

C. FUTURE RESEARCH OPPORTUNITIES

Construct an optimization model based on disaster characteristics to determine the best composition of an assessment team for disaster relief. Suggested maximum constraints or minimization goals would be cost (perhaps by daily expense), total number of teams assigned to disaster scenarios, and the number of personnel assigned to each team. Suggested minimum constraints could include technical gear, berthing space, and cumulative pounds of airlift necessary. Decision variables could include the number of teams and their composition to send on each mission, global information sharing methodologies, and go/no-go assessment criteria.

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APPENDIX A. ETC-003: DATA COMMUNICATIONS ASSESSMENT, CAPACITY PLANNING AND STATUS REPORT

(Country/Location)

Last Update: YYYY-MM-DD
Updated By: Name

- **Objective**

The objective of this assessment is to gather information prior to an emergency to ensure proper response during the emergency. Additionally, this document will help with capacity planning for emergency response preparedness. This document will also be used on the onset of an emergency cluster activation to be updated to ensure proper information is presented. Please fill out one document per country/location and/or agency

General information *(Check all that apply)*

- **Current Security Level**? ☐ No Phase ☐ Phase I ☐ Phase II ☐ Phase III ☐ Phase IV
- **Typical climate?** _____
- **Transportation situation?** ☐ Air ☐ Car ☐ Rail ☐ Boat ☐ Other _____
- **Telephone Service**
  Reliability In-city: ☐ excellent ☐ good ☐ poor ☐ not available
  Reliability In-country: ☐ excellent ☐ good ☐ poor ☐ not available
  Reliability International: ☐ excellent ☐ good ☐ poor ☐ not available
  Data Capacity: ☐ excellent ☐ good ☐ poor ☐ not available
  Does local PTT offer ISDN services? ☐ Yes ☐ No

- **Cellular Service**
  Type of cellular telephone services available:
  ☐ Analog ☐ Digital ☐ GSM ☐ GPRS ☐ 1X ☐ Other _____

Are cellular phones easily available in country: ☐ Yes ☐ No
Reliability In-city: ☐ excellent ☐ good ☐ poor ☐ not available
Reliability In-country: ☐ excellent ☐ good ☐ poor ☐ not available
Reliability International: ☐ excellent ☐ good ☐ poor ☐ not available

- **VHF/UHF Communications**

Typical country frequency band used? ☐ VHF ☐ UHF
What is the channel-spacing in country? _____
Any known restrictions? ☐ No ☐ Yes, Specify _____

- **Wireless LAN/WAN Communications**

This section is designed to identify information about wireless Access point, bridges or Satellite Dish.

Any known regulatory restrictions at the installation site in respect of transmit power or frequency.									
☐ Yes (Specify)								☐ No	
Which frequency is going to be used by bridge/Access Points?								☐ 2.4GHz	
(Leave blank if not known)								☐ 5.8 GHz	
Site latitude:	°	′	″	[N/S]	Site longitude:	°	′	″	[E/W]
To determine the site coordinates use a GPS. Please enter as degrees, minutes, seconds. Must be accurate to within approximately 20 miles / 30 Km .									
Magnetic variation at site:	º [E/W]								
Proposed Satellite & Orbital Slot:					°El:		°Az:		
Magnetic variation at site:	º [E/W]								
Type of Service:	☐ C band			☐ Ku band					
Dish platform notes:									
Typical Antenna Size:	☐ 1.8 m			☐ 2.4 m					
Remarks:									

- **Power Consideration**

Installation voltage: (will be used at the site)	☐ 110-115 V, 60Hz	
	☐ 220-240 V, 50 Hz	
Electrical power source:	☐ City power/ national grid	
	☐ Generator	
	☐ Solar	
Is the voltage stabilized?	☐ Yes	☐ No

Copy page as many times as needed to completely and accurately document all information.

- **Services**

This section will discuss any current service providers available.

Data service provider contact person, address, email, phone, Fax	Service Available	Estimated installation time?	Estimated cost in $USD/Bandwidth	Additional information (specify type of connection)
	☐ Internet (lease line) ☐ Internet (Satellite) ☐ Internet (WLAN)			
	☐ Internet (lease line) ☐ Internet (Satellite) ☐ Internet (WLAN)			
	☐ Internet (lease line) ☐ Internet (Satellite) ☐ Internet (WLAN)			
	☐ Internet (lease line) ☐ Internet (Satellite) ☐ Internet (WLAN)			

Other service provider contact person, address, email, phone, Fax	Service Available	Estimated installation time?	Estimated cost in $USD for services	Additional information
	☐ Contractor ☐ Electrical work ☐ Engineer ☐ Other _____			
	☐ Contractor ☐ Electrical work ☐ Engineer ☐ Other _____			
	☐ Contractor ☐ Electrical work ☐ Engineer ☐ Other _____			
	☐ Contractor ☐ Electrical work ☐ Engineer ☐ Other _____			

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- **Local Supply Companies**

This section will discuss local supply companies or store which could provide technological equipment including but not limited to Cisco products, UPS, laptops and/or other technical products. Please fill out as much as possible.

Local Supply Company contact person, address, email, phone, Fax	Products Available	Standard delivery terms/ Emergency deliver terms
	☐ UPS ☐ Cables ☐ Mast ☐ Network ☐ tools ☐ Electrical ☐ Laptop ☐ Satellite equipment ☐ Other _______________	
	☐ UPS ☐ Cables ☐ Mast ☐ Network ☐ tools ☐ Electrical ☐ Laptop ☐ Satellite equipment ☐ Other _______________	
	☐ UPS ☐ Cables ☐ Mast ☐ Network ☐ tools ☐ Electrical ☐ Laptop ☐ Satellite equipment ☐ Other _______________	
	☐ UPS ☐ Cables ☐ Mast ☐ Network ☐ tools ☐ Electrical ☐ Laptop ☐ Satellite equipment ☐ Other _______________	

Copy page as many times as needed to completely and accurately document all organization.

- **Organization Review**

This section will review all organizations in the region which may need Data Communication service in an emergency.

Organization Name	Contact Person, address, email and phone	ICT Contact person, address, email and phone	Estimated staff members who may need data communication at emergency	Partner? If yes fill out next section
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

Copy page as many times as needed to completely and accurately document all partners.

- **Partner Review**

This section will review all partners in the region which may support or provide ETC-Data Communication service in an emergency. Fill out one row per office per organization. Check all that applies.

Organization Name, address, GPS location	**Physical Consideration**	**Power**	**Data communication situation**
	☐ Main location ☐ Remote location ☐ Tent/Camp ☐ Office Space ☐ Computer room ☐ Storage room ☐ Other_____ ☐ Other _____	☐ Power grid ☐ Generator ☐ Solar ☐ UPS ☐ Backup/UPS ☐ Stable ☐ Grounded	☐ Local Service provider/internet access ☐ Satellite/internet access ☐ BGAN ☐ Public Access points ☐ Bridge/Microwave back to Main location ☐ Other _____ ☐ Other _____ ☐ Other _____
	☐ Main location ☐ Remote location ☐ Tent/Camp ☐ Office Space ☐ Computer room ☐ Storage room ☐ Other_____ ☐ Other _____	☐ Power grid ☐ Generator ☐ Solar ☐ UPS ☐ Backup/UPS ☐ Stable ☐ Grounded	☐ Local Service provider/internet access ☐ Satellite/internet access ☐ BGAN ☐ Public Access points ☐ Bridge/Microwave back to Main location ☐ Other _____ ☐ Other _____ ☐ Other _____
	☐ Main location ☐ Remote location ☐ Tent/Camp ☐ Office Space ☐ Computer room ☐ Storage room ☐ Other_____ ☐ Other _____	☐ Power grid ☐ Generator ☐ Solar ☐ UPS ☐ Backup/UPS ☐ Stable ☐ Grounded	☐ Local Service provider/internet access ☐ Satellite/internet access ☐ BGAN ☐ Public Access points ☐ Bridge/Microwave back to Main location ☐ Other _____ ☐ Other _____ ☐ Other _____

Copy page as many times as needed to completely and accurately document all information.

- List of qualified responders or ICT staff in country/location?

Organization Name	**Responder contact person, address, email, phone and fax**

- **Follow up**

This section will outline a list of follow up actions items and the responsible parties.

Action item	**Person responsible & Organization**	**Estimated completion date (yy-mm-dd)**

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APPENDIX B. ECHO HUMANITARIAN AID & CIVIL PROTECTION INITIAL NEEDS ASSESSMENT CHECKLIST (INAC)

(Front Cover)

Population Profile (of CA):

- Name of Catchment Area (CA)
- Original population
- Influx/outflux (when/size)
- Number of injured
- Number of dead
- Number of missing
- Number of disabled (if available)
- Children < 5 years (as % of pop)
- Sex ratio = number of females / number of men
- Any ethnicity/minority issues
- Average household size

If possible, all population data to be disaggregated by sex

Livelihoods (of CA):

- Which social groups are at risk/why?
- Main livelihood strategies?
- Impact of disaster on different livelihood assets and strategies?
- Loss of livelihood assets?
- Coping strategies adopted?
- Opportunities to recover or support appropriate coping strategies?
- Livelihood challenges relating to social difference (gender, disability, marginalised groups etc)
- Agricultural seasonality and climate patterns in the region

Coordination:

- Local system of coordination
- Presence of local first responders?
- Presence of international partners in the field now?

Main sectors	Health	Food and nutrition	WASH	Shelter and NFIs	Protection
ANALYSIS (based on information of the current situation) 	1. Point mortality: number of deaths per catchment area. 2. Is there a major problem with 1st aid provision to the injured? 3. Is there a major problem with evacuation of the injured and pregnant women? 4. Is there an adequate health facility available dealing with immediate problems of the population? (Personnel and medical supplies, waste management?) 5. Is there any suspicion of a major epidemic of health problem emerging or already present? 6. Is the disaster causing a major psychological trauma for a part of the population?	1. Are all social groups able to meet their short-term food consumption needs? 2. Is the problem due to insufficient food availability, food access or both? 3. Do people have the ability to prepare meals (water, fuel, cooking utensils, etc.)? 4. Estimate what % of HH require food assistance, what is the level (shortfall in total food consumption requirements) and the duration of assistance required? 5. Would assistance in cash or kind be most appropriate? Should assistance be freely provided or linked to conditionality (e.g. labour, training etc)? 6. Are there specific vulnerable groups and nutritional needs?	1. Is the water quantity < 15 ltd/pers/day? 2. Water stress: Is the quantity of water available/pers substantially less (< half) than normally used? 3. Are there any problems of access to water supplies? 4. Is it preferable to conduct emergency repair on the existing water supply system or to construct new emergency water supply system(s)? 5. Is there a high risk of contamination of water sources and/people from faeces? 6. Are there any constraints to good hygiene behaviour? Which ones?	1. Settlement - WE affected HHs: • Return to the site of their original dwellings? • Settle independently within host communities/families? • Re-accommodated in temporary planned or self-settled camps? 2. What are the options for emergency shelter? 3. Are there critical environmental factors to take into consideration? 4. How can shelter materials best be mobilized? 5. Identify key infrastructure in need of repair to facilitate emergency response. 6. What is the scale of the need for NFIs? 7. What is the capacity of the authorities or communities to respond?	1. What immediate steps can be taken that will have an important impact on addressing protection issues? 2. Compliance aptitude – how willing are the authorities to address protection issues (including GBV)? 3. How can the coping strategies of the vulnerable populations be strengthened? 4. What are the main security threats?
ACTION NEEDED (think about the possible following actions and prioritize) 	7. Organise or reinforce immediately the mass casualty management, in particular the first aid facility and the triage of injured persons. 8. Organise or reinforce immediately adequate evacuation facility for the seriously injured and pregnant women with delivery problems. 9. Organise or reinforce health facility (which inputs are needed as priority?) Is there a need to bring in additional medical staff? Is medical waste management in place? 10. Evaluate the need to vaccinate children and/or adults urgently (if epidemics are expected and coverage is below 80%). 11. Evaluate the need to establish an EWARN (Early Warning and Response Network) with rapid investigation capacity (if epidemics are expected). 12. Evaluate the need to establish basic psycho-social or mental health services. 13. Imposition, information, education and communication on public or environmental health hazards and measures to be observed by the population. 14. Emergency replacement of key drugs for chronic diseases (HIV, TB, diabetes, Hypertension, Thyroid problems, ..)	7. Unconditional Food Transfers, either food commodities provided on a blanket basis (General Food Distributions), commodities targeted according to specific criteria / locations; or as unconditional cash transfers. 8. Cash or food provided on the basis of training or labour provision. 9. Blanket nutritional interventions (e.g. Blanket Supplementary Feeding programme) where nutritional communities are distributed to all individuals of a certain age, in a certain area deemed to be facing or at risk of a nutritional crisis. 10. Provision of food preparation and food storage materials. Items required for preparing food, such as cooking sets, cooking fuel and water. 11. Provision of information on entitlements. 12. Road/market infrastructure rehabilitation. 13. Support to further food security assessments, nutritional screening, surveillance and surveys.	7. Emergency (need/trial/dilution) drinking water supplies measures are urgently required if less than 15 ltd/pers/day is available (particularly if environmental risk factors such as dense population, contaminated water supply, poor hygiene are high). 8. Emergency "shock" treatment of the drinking water supply is required if the existing system is still functional, but has likely been contaminated (as a result of physical damage to its infrastructure, interruption/intermittent service provision, etc.). 9. HH water treatment is recommended if the quality of drinking water is poor and most HH understand or can be quickly taught how to use home water treatment effectively. 10. The need for adequate HH water transport and storage facilities should be assessed in all cases. 11. Emergency sanitation (particularly excreta disposal) and hygiene promotion measures are required immediately if people are settled in high density areas and exposed to poor sanitary conditions and/or probable diarrhoeal outbreaks. 12. Emergency distribution of WASH NFI is required when acute shortage has been objectively observed.	8. Provision of emergency shelter material (tarpaulin, tents, rope, etc.). 9. Provision of specialised emergency and/or transitional shelter (tents). 10. Adapt shelter needs according to HH sizes, gender and disability factors, taking into consideration long-term displacement needs. 11. Mobilise service provision around public infrastructure functioning as emergency shelter. 12. Source and provide NFI, according to priorities (clothing, cooking, access to water). 13. Provision of fuel for cooking/heating. 14. Negotiate with the relevant actors on gaining adequate land for emergency/ temporary shelter. 15. Provision of tools/materials for the emergency repair of damaged homes.	5. Set up registration mechanisms for documenting unaccompanied and lost children to enable effective tracing and family reunification as well as basic measures to take care of them during the emergency period. 6. If appropriate and possible, negotiate with the authorities on protection issues. 7. Negotiate access to detention facilities with the relevant authorities. 8. Consider protection issues in all conventional emergency interventions and how the related activities impact on the communities' protection coping strategies. 9. Review other potential emergency interventions (health, food, NFI etc.) to ensure that the systems and practices do not cause family separation. 10. If appropriate, consider GBV minimum package (clinician, counselling, PEP, antibiotic, emergency contraception etc.). 11. Ensure that policies are put into place that guide humanitarian agencies on what to do with sensitive information which can potentially harm people's safety or dignity.
THRESHOLDS & STANDARDS 	**Cut-off values for emergency warning** **Health status** • Crude death rate: more than 1/10,000 people/day • Under five death rate: more than 2/10,000 U5/day **Health Facility Utilization** • Among stable pop: 0.5 – 1.0 new contacts/pers/yr • Among displaced/refugee populations: up to 4.5 new contacts/pers/yr • After a natural disaster: contacts for first aid will be much higher; a solid part of the affected population may visit the established first aid centre or the surviving health facility in the first few days. (Count on 20 to 50% of the catchment population looking for contact with the health facility). **Health Personnel Requirements** Activity — Output of 1 pers/hr of work OPD consultation — 5 consultations OPD treatment (dressings etc) — 6 treatments Vaccination — 30 children U-5 clinic & growth monitoring — 10 children ANC — 6 women Assisted delivery — 1 delivery *Note: one person/day = 7 hours of field work* Health workers emergency requirements for the above = 60 staff per 10,000 people.	**Food** Total needs of 2,100 Kcal/person/day A 100% daily ration (needs may be partial) consists of: • 350-400 g/person/day of staple cereal • 20-40 g/person/day of an energy-rich food (oil/fat) • 50 g/person/day of a protein-rich food (vegetables). To supply 10,000 people with food for one week this is approximately: • 20.0 MT of staple cereal • 2.8 MT of an energy-rich food • 3.5 MT of a protein-rich food **Cash** • Cash transfer necessary to purchase equivalent food ration calculated according to local market costs (to be adjusted on the basis of market price trends). • Cash for work ratios should take into account both the local casual labour rates and the cost of meeting basic needs (eg. the food basket). • Work conditionality should not undermine recovery of livelihoods. • Workers should not have to travel unacceptable distances to access work or cash / food distribution. • Gender roles should be factored in appropriately. **Nutrition status** Acute malnutrition (W/H < -2Z scores in under 5 yr population): > 10% of under fives GAM — SAM Normal rate — <5% — <2% Poor — 5 to 9 % — <2% Serious — 10 – 14 % — >2% Critical — > or = 15 % — >5%	**Water** • Minimum: 7.5 - 15 ltd/pers/day o drinking: 2.5-3 ltd/pers/day o drinking and cooking: 3-6 ltd/pers/day o hygiene: 2-6 ltd/pers/day • No faecal Coliforms/100 ml (for non treated water supplies at point of delivery) • Maximum 250 users per tap; 500 users per hand pump; 400 users per open well • Distance to water points: < 500 m from housing • Queuing time at water source < 15 minutes (on average, but not at peak times); max. 3 minutes to fill 20 lts at water point/tap • At least two 10-20 ltr water collecting containers (=enough storage capacity per HH) **Sanitation** • Latrine: ideally one/family, minimum one toilet/20 persons (but up to 50 persons at initial stage) • Distances: o max. 50 m – min. 6 m from housing o min. 30 m from closest water point • Check soil conditions and water table level (pits) • Use of toilets arranged by HHs or gender • Refuse disposal: one communal pit/500 people **Hygiene** • 1 Hygiene Promoter for 500 people • Soap: 250g /person/month • Laundry soap: 200g/person/month • Sanitary hygienic supplies & washable nappies	**Camps (Like Phase)** • Min area available per person: 45 m2 • Min shelter space per person: 3.5 m2 • Min distance between two shelters: 3 m • Open space/public facilities/roads: 15-20% • Favourable drainage & soil conditions **Shelters** • Socially acceptable, durable, disaster safe and upgradable HH design/ materials • Optimal thermal comfort and ventilation • Access to WASH facilities incorporated • Vector control measures incorporated • Locally sourced materials and labours • Local standard of workmanship & materials • Accountable procurement of resources • Limited environmental impact of settlements **NFI** • Clothing, bedding and sleeping mats • Hygiene NFI (see WASH column) • Cooking and eating utensils • Stoves, fuel (15 kg firewood/HH/day) & lighting materials • Tools and equipments (incl nets if necessary)	

Logistics (of CA):

- Local transport network and constraints?
- Nearest road, airport, seaport, rail station/customs procedures?
- Car, truck and air transport for hire/ availability of warehouses?
- Electricity / communication infrastructure?
- Availability of emergency power generation?
- Availability of fuel?
- Local transport permits (for goods/ persons)?
- Local topographic characteristics/ constraints
- Local weather patterns/constraints
- Local procurement (shops open; markets functioning; availability of local construction material and other material and man power)?
- Options to relieve logistical constraints?
- Local logistics coordination/support mechanisms?

Safety and Security (of CA):

- Security threats/constraints/UN Security Phase?
- Safety issues? Threat of crime?
- Attitude of the local authorities?
- Use and nature of roadblocks?
- Constraints on humanitarian access?
- Humanitarian community targeted?
- Gender vulnerabilities and coping mechanisms as a result of disaster?

(Back Cover)

APPENDIX C. UNDAC ASSESSMENT MISSION PLANNING FORM

United Nations Nations Unies

OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS

ASSESSMENT-MISSION PLANNING FORM

(To be used as guidance when planning or coordinating an assessment-mission. Please delete or adapt as appropriate.)

Precise definition of the field trip

- Area to be visited.
- Locations.
- Route planning.
- Time frame.

Team composition

- Number of participants.
- Gender balance.
- Representation from other agencies, sector specialists.

Distribution of tasks

- Team Leader (assessment team).
- Sector-specific tasks.
- Other responsibilities, e.g., logistics, communications, reporting, media, etc.

Main objectives

- Broad objectives.
- What questions need to be answered?
- Who has the needed information?
- Form of required output.

Data collection issues

- Observation.
- Interviews.
- Surveys.
- Checklists.
- Sampling.
- Indicators and standards.
- Assumptions.

Logistics and organization

- Transport and movement plan.
- Accommodation.
- Communication.
- Supplies.
- Equipment

Security

- Security clearance.
- MOSS compliance.

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APPENDIX D. UNJLC FLYAWAY KITS

ANNEX C
UNJLC Flyaway kits / Dec 2003 / breakdown in modules

	#	make	specifics, extras
Module 1			
suitcase	1		
laptop with charger	1		Configuration including:Windows XP, Office 2000, Mapsource, Wireless Lan card, Lotus Notes, Antivirus, WinZip, Irfanview, Acrobat reader, Acrobat writer, Yahoo messenger, photo application according to camera, CD burner, DVD combo, Yahoo messenger (or MSN), Post-it.
12 Volt adapter	1		for laptop and Mini-M, targus multiuse type
printer A4	1		
printer cartridge	3		
printing paper	500		
Flash drive	1		512 MB
5port ethernet hub	1		
cables	2		ethernet (CAT 5) 3m
cable	1		ethernet (CAT 5) 10m
Satphone	1	Thuraya	including docking station, car charger, data cable, spare battery
Satphone	1	BGAN	connection cable to computer
additional battery BGAN			
GPS	1		with data cable combined 12 V adaptor, external antenna
batteries for the GPS	4 unt		
extension cable	2		adapters for different plugs
VHF handheld	1	Motorola GP 380	if frequencies of country of deployment known, programmed, otherwise only , charged
Spare battery (VHF)	1		
VHF charger	1		
VHF mob charger	1		
DVD camera	1		with softcase
key-chain torch	1		
CD Roms	10		

Module 2			
back pack 120l	1		
water bladder			wide mouth, 3 liters
first aid kit	1		commercial, if not already included with following extras:emergency blanket, water purification, trauma clothes shears, sam splint, rehydration, malaria, sterile syringe (transfusion), broad spectrum antibiotics, medicin for amoeba etc.
Torch	1		
sets of spare batteries for torch	2		
Torch with head band	1		led (+halogen optional)
sets of spare batteries for torch with headband	2		
compass	1		Silva 7360 type
mirror (emergency)	1		
emergency whistle	1		
money belt	1		for passport copies, petty/security cash
Magnesium (fire) stone	1		
waterproof container	1		10 cm high x 3 cm (round)
leatherman tool	1		
field sewing / repair kit	1		
cord	1		nylon, 3mm, 15m, breaking str.
rope	1		8 mm, 15m, static
tape	1		fabric tape, 1 roll (gaff tape)
ratchet strap	1		(boat strap)
Jacket, rain, poncho	1		
Sleeping bag	1		synthetic or sleeping bag liner (alt)
camping mattress			ultralight camping mattress
Mosquito net	1		
Mosquito repellent	1		
antisceptic soap	4		
sanitizing gel	1		
liquid castille soap	1		"Dr. Bronners" or equivalent, 250 ml
nylon drawstring bags	2		"compression stuff sacks"
note pad A5	4		
scissors	1		

pens	4		
permanent marker	2		
highlighters	2		
MREs	7dy		
Toilet paper	6		
water filter	1		personal, katadyn, ceramic
towel	1		absorbent, cotton
plastic sheeting	1		8sqm
in addition to basic kit but not packed: Field vest			once decision on complete personnel kit has been made, I recommend to have a jacket tailored according to exact needs.
Module 3 a			
Office tent	1		
Foldable chair	2		
Foldable table	1		
Lamp	1		
Hexamine stove	1		alt. stove solid fuel
Module 3 b			
Bed			Light weight, folding
Clothes line			pegless
10 liter jerrycan			collapsible
Mug, coffee	1		unbreakable
bowl	1		unbreakable
pots	1		individual set of three
water filter	1		replacement for filter in module 2
Candles	1		box of 12, 25x2
Module 4			
UPS	1		
combined fax, printer and scanner	1		
A1 printer	1	hp design jet 120nr printer (C7791B)	
printer cartridges	5 sts		
paper rolls A1	10		
Module 5			
generator	1	15Kva	

generator	1	45Kva	has to be flown as hazardous cargo
Module 6			
vehicle			roofrack, additional spare tyre, first aid kit, ballistic blankets, recovery kit (ARB), winch, toolkit, bull bar, air compressor, GPS V or better with complete mapsource software, split rims with manual tyre change kit, tubes, highlift jack.
VHF	1		installed and programmed if frequencies available
HF	1		installed and programmed if frequencies available
Antenna VHF	1		installed
Antenna HF	1		installed
GPS fixed			
GPS antenna			installed
Module 7			
plotter	1	hp design jet 5500ps printer (60in) (Q1254A)	
cartridges	5 sets		
paper	500		
Module 8			
helmets			
armored gear			
Module 9			
NBC equipment	1		
Module 10			
802.11b compat. wireless base-station	1		
cable	1		50 m CAT 5
ethernet 5 plugs	20		
wire cutters	2		
server computers	2		with LCD monitors

APPENDIX E. SAMPLE LIST OF PERSONAL AND PROFESSIONAL GEAR

PERSONAL ITEMS

Underwear x 3 Days + extra
Shirts x 3 Days (recommend black Cisco Polo)
Pants x 3 Days (recommend khaki cargos, 5.11 or equivalent)
Socks x 3 Days + 1 extra
Shoes (boots/steel toed/etc) NO OPEN TOES
Cap/Visor or hat
Gloves (leather work gloves or wool gloves for cold)
Towel
Jacket
Sleeping bag / pad Cash, $50 min, small bills/coins
Poncho/rain suit
Deodorant
Toothbrush/paste
Shampoo
Mouthwash
Dental floss
Hand Sanitizer
Razor & spare blades
Sewing kit
Water bottle (2+, filled)
PowerBar/CliffBar/other snacks
Baby Wipes
Insect repellent
Sunglasses
Spare eyeglasses (if needed)
Spare contact lenses, supplies (if needed)
Hairbrush/comb
Sunscreen
Feminine hygiene items
Prescription medications (72 hr - 2 week supply) & copy of Rx (if needed)
ID badge
Government issued ID

PERSONAL ITEMS

Amateur Radio license
Other ID as applicable (EMT credentials, etc.)

SAFETY / PERSONAL PROTECTIVE EQUIPMENT

Flashlights
Headlamp
Dust mask (N95 style)
Ear Plugs
Extra batteries for lights
Gloves, leather
Whistle
Personal first aid kit
- band-aids
- OTC meds
Leatherman / multitool maps
Verified ingress/egress routes of travel
Emergency contact information on file
Verified points of contact on-scene

PERSONAL TECHNOLOGY

Laptop (with recent backup)
Software for a VPN Client (verified to operate)
Laptop power adapter
Cat5 Ethernet cable + coupler
USB -> RS-232 adapter & drivers (verify)
FTP/TFTP server software (verify)
Mobile phone
Mobile phone charger
3G/4G wireless card
Laptop mouse
Mobile phone headset
Point-and-shoot camera
Camera USB cable
DC-AC inverter (small)
USB thumb drive
iPod

PERSONAL TECHNOLOGY
Flip video cam
GPS
Amateur radio HT + charger
Spare batteries for everything!
ASSESSMENT TEAM PROFESSIONAL GEAR
BGAN
VSAT
Iridium satellite phone & AC/DC chargers
SPOT tracker + spare batteries
Multi-meter
Cellular phone (GSM)
Cellular phone (CDMA)
Cellular/Wi-Fi hotspot device
Alternate power source
Batteries
Portable Wi-Fi access point
Laptop
Web camera
Assessment forms

Table 3. Sample Fly-Away Kit Inventory (After: TACOM, 2012)

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APPENDIX F. RTAT CHECKLIST

RTAT Checklist

The Rapid Technology Assessment Team (RTAT) is used to gather information prior to and following a disaster to assist in efficient response by relief agencies. This checklist will be utilized to guide a standardized assessment of Information Communications Technologies (ICT) by early responder assessment teams who have a working knowledge of each system to determine ICT status either pre-disaster (baseline assessment) or following a disaster with periodic updates. The assessments will be reviewed by subject matter experts to and provide results and recommendations to a global audience relief agencies. This checklist will also help with capacity planning for emergency response preparedness. Please fill out one document per country/location.

Assessment Location:_____

Assessment Team Leader: _____

Assessment Team Leader contact information: _____

_____

_____

Assessment Team Member: _____

Assessment Team Member: _____

Assessment Date: _____

Geographical Information	
Province:	District:
Sub-district:	Village:
Latitude:	Longitude:

_____

Table of Contents

GSM Cellular Communications System

	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	
	Approximate number of towers:				
	Approximate number of GSM phones in region:				
	Gov't or Industry owned system:				

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 1a: Yes ☐ / No ☐

Use and/or reproduce as necessary section 1 a/b/c/___

GSM Cellular Communications System		
Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Continued on section 1___: Yes ☐ / No ☐

CDMA Cellular Communications System					
	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	
	Approximate number of towers:				
	Approximate number of CDMA phones in region:				
	Gov't or Industry owned system:				

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 2a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 2 a/b/c/___

CDMA Cellular Communications System		
Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Tower Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 2___: Yes ☐ / No ☐

UHF Communications System

Pre-disaster		Functional		Comments:
Yes	No	Yes	No	
☐	☐	☐	☐	

Approximate number of repeaters:

Gov't or Industry owned system:

Frequency Band used:

Channel spacing in region:

Known restrictions:

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 3a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 3 a/b/c/___

UHF Communications System		
Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Continued on section 3___: Yes ☐ / No ☐

VHF Communications System

	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	

Approximate number of repeaters:
Gov't or Industry owned system:
Frequency Band used:
Channel spacing in region:
Known restrictions:

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 4a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 4 a/b/c/___

VHF Communications System		
Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Repeater Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Continued on section 4___: Yes ☐ / No ☐

Satellite Communications System

	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	

Approximate number of satellites for ICT:
Gov't or Industry owned system:
Frequency Band used:
Bandwidth available:
Known restrictions:

Satellite Number	Latitude:	Longitude:
	Magnetic Variation at site:	Antenna size:
	Elevation:	Azimuth:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 5a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 5 a/b/c/___

Satellite Communications System		
Satellite Number	Latitude:	Longitude:
	Magnetic Variation at site:	Antenna size:
	Elevation:	Azimuth:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Satellite Number	Latitude:	Longitude:
	Magnetic Variation at site:	Antenna size:
	Elevation:	Azimuth:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email
Notes:		

Continued on section 5___: Yes ☐ / No ☐

Copper Ground Based Communications System

Pre-disaster		Functional		Comments:
Yes	No	Yes	No	
☐	☐	☐	☐	

Approximate number distribution sites:
Approximate number of subscribers:
Bandwidth available:
Gov't or Industry owned system:
Resilience to follow on incidents:
Backhaul:

Distribution site Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 6a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 6 a/b/c/___

Copper Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Copper Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 6___: Yes ☐ / No ☐

Fiber Optic Ground Based Communications System					
	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	
	Approximate number distribution sites:				
	Approximate number of subscribers:				
	Bandwidth available:				
	Gov't or Industry owned system:				
	Resilience to follow on incidents:				
	Backhaul:				
Distribution site Number			Latitude:		Longitude:
			Points of Contact		
			Name:		Parent Organization:
Functioning			Phone:		Email
Yes / No			Name:		Parent Organization:
☐	☐		Phone:		Email
Notes:					

Continued on section 7a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 7 a/b/c/___

Fiber Optic Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Fiber Optic Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 7___: Yes ☐ / No ☐

DSL Ground Based Communications System					
	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	
	Approximate number distribution sites:				
	Approximate number of subscribers:				
	Bandwidth available:				
	Gov't or Industry owned system:				
	Resilience to follow on incidents:				
	Backhaul:				
Distribution site Number			Latitude:		Longitude:
			Points of Contact		
			Name:		Parent Organization:
Functioning			Phone:		Email
Yes / No			Name:		Parent Organization:
☐	☐		Phone:		Email
Notes:					

Continued on section 8a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 8 a/b/c/___

DSL Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

DSL Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 8___: Yes ☐ / No ☐

Cable Ground Based Communications System

	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	

Approximate number distribution sites:	
Approximate number of subscribers:	
Bandwidth available:	
Gov't or Industry owned system:	
Resilience to follow on incidents:	
Backhaul:	

Distribution site Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email

Notes:

Continued on section 9a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 9 a/b/c/___

Cable Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Cable Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 9___: Yes ☐ / No ☐

T1 Ground Based Communications System

Pre-disaster		Functional		Comments:
Yes	No	Yes	No	
☐	☐	☐	☐	

Approximate number distribution sites:
Approximate number of subscribers:
Bandwidth available:
Gov't or Industry owned system:
Resilience to follow on incidents:
Backhaul:

Distribution site Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email

Notes:

Continued on section 10a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 10 a/b/c/___

T1 Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Cable Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 10___: Yes ☐ / No ☐

ISDN Ground Based Communications System					
	Pre-disaster		Functional		Comments:
	Yes	No	Yes	No	
	☐	☐	☐	☐	
	Approximate number distribution sites:				
	Approximate number of subscribers:				
	Bandwidth available:				
	Gov't or Industry owned system:				
	Resilience to follow on incidents:				
	Backhaul:				
Distribution site Number		Latitude:		Longitude:	
		Points of Contact			
		Name:		Parent Organization:	
Functioning		Phone:		Email	
Yes / No		Name:		Parent Organization:	
☐	☐	Phone:		Email	
Notes:					

Continued on section 11a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 11 a/b/c/___

ISDN Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

ISDN Ground Based Communications System		
Distribution site Number	Latitude:	Longitude:
	Bandwidth available:	
	Gov't or Industry owned system:	
	Resilience to follow on incidents:	
	Backhaul:	
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
Yes / No	Name:	Parent Organization:
☐ ☐	Phone:	Email
Notes:		

Continued on section 11___: Yes ☐ / No ☐

Power System

Source: Nuclear Coal Natural Gas Diesel Petrol Solar Hydro Other_____

Pre-disaster		Functional		Comments:
Yes	No	Yes	No	
☐	☐	☐	☐	

Approximate number distribution sites:	
Approximate number of subscribers:	
Gov't or Industry owned system:	
Resilience to follow on incidents:	
Voltage available:	Voltage stabilized: Yes ☐ No ☐

Distribution site Number	Latitude:	Longitude:
	Points of Contact	
	Name:	Parent Organization:
Functioning	Phone:	Email
	Name:	Parent Organization:
Yes / No		
☐ ☐	Phone:	Email

Notes:

Continued on section 12a: Yes ☐ / No ☐

Use and/or reproduce as necessary Section 12 a/b/c/___

Power System			
Source: Nuclear Coal Natural Gas Diesel Petrol Solar Hydro Other_____			
	Gov't or Industry owned system:		
	Resilience to follow on incidents:		
	Voltage available:	Voltage stabilized: Yes ☐ No ☐	
Distribution site Number	Latitude:	Longitude:	
	Points of Contact		
	Name:	Parent Organization:	
Functioning	Phone:	Email	
Yes / No	Name:	Parent Organization:	
☐ ☐	Phone:	Email	
Notes:			

Power System			
Source: Nuclear Coal Natural Gas Diesel Petrol Solar Hydro Other_____			
	Gov't or Industry owned system:		
	Resilience to follow on incidents:		
	Voltage available:	Voltage stabilized: Yes ☐ No ☐	
Distribution site Number	Latitude:	Longitude:	
	Points of Contact		
	Name:	Parent Organization:	
Functioning	Phone:	Email	
Yes / No	Name:	Parent Organization:	
☐ ☐	Phone:	Email	
Notes:			

Continued on section 12___: Yes ☐ / No ☐

Fuel Available					
	Price	Provider	Latitude:	Longitude:	Amount Available
Diesel					
Gas					
Aviation					
Methanol					

Notes:

Average Observed Winds		
	Speed	Kts/mph/kmh
Day		
Night		

General Assessment Observations

Actions

ID	Action Item	Assigned To	Due By
			[mm/dd/yyyy]
			[mm/dd/yyyy]
			[mm/dd/yyyy]

Assessors:

Team Leader: _____ **Date:** ___/___/____

Team Member: _____ **Date:** ___/___/____

Team Member: _____ **Date:** ___/___/____

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